



**Further development and validation of the choice experiment method with a special focus on improving the data collection process  
applications to economic valuation of non-marketed environmental goods**

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*Publication date:*  
2009

*Document version*  
Publisher's PDF, also known as Version of record

*Citation for published version (APA):*  
Olsen, S. B. (2009). *Further development and validation of the choice experiment method with a special focus on improving the data collection process: applications to economic valuation of non-marketed environmental goods*. Institute of Food and Resource Economics, University of Copenhagen.

**PhD thesis:**

Further development and validation of the Choice Experiment method with a special focus on improving the data collection process - Applications to economic valuation of non-marketed environmental goods

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July 2009

**Summary**

The subject of this thesis is Choice Experiments (CE) applied to economic valuation of non-marketed environmental goods. While the CE method has become increasingly popular in recent years, it is still a rather new method in the sense that a number of research questions remain to be answered. The aim of the thesis is to disentangle some of these issues in order to improve the usefulness of the CE method in obtaining policy advice. For any economic valuation survey to be useful in terms of informing policy decisions regarding a specific good, it is imperative that the obtained value estimates as closely as possible reflect the true values associated with that good. The question is then how to obtain such estimates in CE surveys. In the CE literature, much attention has been given to the econometric modelling of choices. Considerable improvements have been made through the past decade with respect to correctly modelling the preferences stated through choices, and this has certainly increased the precision of value estimates as well as the reliability of the method as such. This modelling issue is concerned with obtaining the best possible value estimates given the data available. While correct modelling of choices is important, it is equally evident that the quality of the data available is of great significance. No matter how rich and flexible an econometric model used in the parametric modelling of choices in a dataset – If the data collected is of very poor quality, for instance in terms of choices not reflecting the intended tradeoffs, the value estimates will be flawed and, thus, useless for policy advice. The issue of improving the data collection process, which has received less attention in the CE literature than the modelling issue, is the main focus of this thesis.

The thesis consists of four papers all concerned with improving the data collection process. The papers can be divided into two main parts. The first part concerns potential survey mode effects associated with the choice of mode for administering a CE survey questionnaire. The second part focuses on improving the construction of CE survey questionnaires.

The first part of the thesis, consisting of one paper, finds that even though minor survey mode effects might emerge when using a web-based questionnaire in an internet panel rather than a more traditional paper-and-pencil questionnaire approach, the obtained Willingness-To-Pay estimates do not differ significantly across the two survey modes. It is thus concluded that internet-based questionnaires can serve as a suitable and reliable alternative to paper-and-pencil questionnaires when collecting data for CE surveys. This is especially the case when the survey focuses on policy advice in terms of estimation and reporting of Willingness-To-Pay for some good.

Consisting of the three remaining papers, the second part of the thesis finds evidence that the quality of data collected might be improved by constructing CE questionnaires in a way that better recognizes and accommodates the seemingly anomalous respondent behaviour that is often observed in CE surveys. In particular, it is established that Starting Point Bias which is a well-known problem in dichotomous choice Contingent Valuation can also be a problem in a CE survey, but it is only attributed to female respondents. However, results indicate that allowing respondents to engage in learning about own preferences as well as the institutional setting of the survey can reduce the impact of the starting point bias. Accordingly, it is suggested to present respondents with one or preferably more so-called Instructional Choice Sets prior to the actual preference eliciting choice sets in order to induce and promote the learning process. Another issue which this second part of the thesis brings a novel contribution to is that of hypothetical bias. Specifically, the use of an Opt-Out Reminder as an augmentation of Cheap Talk in CE surveys is suggested. Rather than merely adopting the Cheap Talk practice directly from contingent valuation, it should be adapted to fit the CE format. A significant decrease in

Willingness-To-Pay is found when introducing the Opt-Out-Reminder as an augmentation to Cheap Talk. This suggests that the Opt-Out Reminder could be a promising improvement in the continued effort to get rid of hypothetical bias in choice experiment surveys. The final contribution in this second part of the thesis deals with certainty in choice. Using respondents' stated certainty in choice for each single choice as the dependent variable, model results show that the stated level of certainty increases significantly as the utility difference in choice sets increases. This is at odds with Huber and Zwerina's (1996) recommendation to aim for utility balance when designing choice sets. The results presented in the thesis suggest not to aim for utility balance as this could result in very uncertain choices, maybe even completely random. Such choices would provide relatively limited if any information about the respondent's true preferences. Furthermore, there is evidence that stated certainty is generally higher for men than for women. This corresponds nicely to the fact that women tend to be prone to Starting Point Bias. Finally, the results suggest that a learning effect may increase stated certainty in choice.

Overall, the results in the second part of the thesis underline the importance of seeking to understand the mechanisms underlying seemingly anomalous behaviour in CE surveys. Psychological insights into such behaviour can facilitate adjustment and adaption of questionnaires in order to reduce the presence of anomalous behaviour *ex ante*, and consequently increase the quality of collected data. For instance, letting respondents engage in learning processes prior to the preference eliciting choice sets will probably lead to increased certainty in choice which could further entail a decrease in the impact of starting point bias and maybe also hypothetical bias.